UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/719,303	12/11/2000	Martin Schadt	08130.0058	7024

22852 7590 03/08/2005

FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP
901 NEW YORK AVENUE, NW
WASHINGTON, DC 20001-4413

EXAMINER	
HON, SOW FUN	

ART UNIT	PAPER NUMBER
1772	

DATE MAILED: 03/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/719,303	SCHADT ET AL.	
	Examiner	Art Unit	
	Sow-Fun Hon	1772	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) *26-29* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/04/05 has been entered.

Response to Amendment

Withdrawn Rejections

2. The 35 U.S.C. 102(b) and 103(a) rejections have been withdrawn due to Applicant's amendment dated 01/04/05.

New Rejections

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

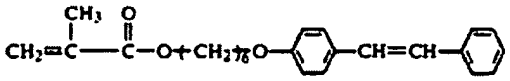
4. Claims 1-8, 11, 16-17, 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Omelis et al. (US 5,098,975) in view of Shannon et al. (US 5,073,294).

Regarding claims 1, 5-6, Omelis has a polymerizable mixture comprising at least the following two components: (i) a liquid crystal monomer having cross-linkable groups (stilbene monomer I-A) and (ii) a photo-orientable monomer (azo dye monomer II-C) (column 10, lines 50-55). As seen on the next page, the stilbene group is liquid crystalline (mesogenous) with the

two vinylic double bonds providing the cross-linkable groups in monomer I-A (column 2, lines 60-65), and the azobenzene linking group provides the cis-trans isomerizable photo-orientable group (claim 5) for the azo dye monomer (column 6, lines 10-25) (claims 6) which is monomer II-C.

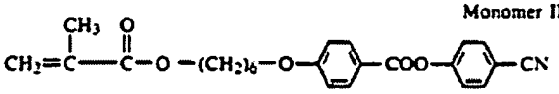
Monomers of Formula I:

Monomer I-A

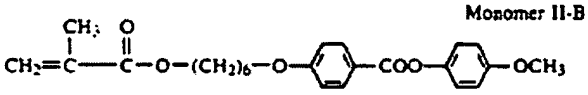


Monomers of Formula II:

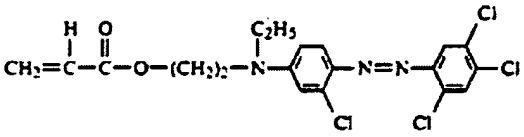
Monomer II-A



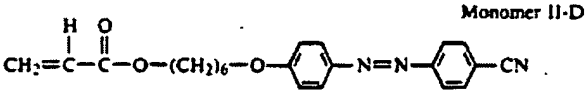
Monomer II-B



Monomer II-C



Monomer II-D



Omelis teaches stretching to orient the liquid crystal (column 9, lines 50-65). Omelis fails to teach photo-orientation of the photo-orientable monomer (azo dye monomer), and that the photo-orientation of the photo-orientable monomer induces an alignment of the liquid crystal monomer.

Shannon teaches that liquid crystals (smectic or nematic mesophases) can be oriented using linearly polarized light (column 6, lines 30-40) with the aid of an azo dye (column 6, lines 55-70), wherein the azo dye is oriented by the linearly polarized light and orient the liquid crystal

in contact with it (column 7, lines 50-60). Shannon teaches that orientation by linearly polarized light (laser alignment) allows other orientations to be induced (column 9, lines 10-20) in order to provide multi-orientation (column 10, lines 1-10).

Therefore, because Shannon demonstrates the advantages of using linearly polarized light to orient liquid crystal with the aid of an azo dye, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used linearly polarized light to photo-orient the photo-orientable azo dye monomer of Omelis, to induce an alignment of the liquid crystal monomer of Omelis, in order to provide the desired multi-orientation of the liquid crystal.

Regarding claim 7, the left segment of monomer II-C of Omelis, shown above, has a vinylic acrylate group which is linearly photo-polymerizable (column 3, lines 55-65).

Regarding claim 8, Omelis fails to teach that the cross-linkable liquid crystal has a nematic phase.

Shannon teaches that under ultraviolet light irradiation, nematic and smectic mesophases can undergo rapid photopolymerization to freeze-in the structure and orientation of the nematic and smectic phases, which provide valuable optical and physical properties (column 1, lines 13-23).

Therefore, because Shannon demonstrates the advantages of using liquid crystal having a nematic phase, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a liquid crystal with a nematic phase as the crosslinkable liquid crystal component of Omelis, in order to provide the desired valuable optical and physical properties to the finished article.

Regarding claim 11, the left segments of the monomers of Formulae I and II of Omelis, shown above, are acrylates.

Regarding claims 2-4, when component (i) (crosslinkable liquid crystal (mesogenous monomer I-A) of Omelis, is present in the amount of 100 parts by weight (154 mg normalized to 100). Component (ii) (photo-orientable monomer II-A) of Omelis, is present in the amount of 2050 parts by weight (3.0 g adjusted with the amount of monomer I-A normalized to 100), which is within the claimed range of at least 0.1 part by weight (claim 2), of at least 1 part by weight (claim 3), and of at least 10 parts by weight (claim 4).

Regarding claim 16, Omelis teaches that the mixture is dissolved in a solvent (dioxane) (column 12, lines 60-70).

Regarding claim 17, Omelis teaches an azo dye molecule (column 6, lines 20-30) in the film precursor mixture, which makes the film precursor presensitized to light, and is carried by a substrate (column 10, lines 1-5).

Regarding claims 19-20, Omelis teaches that the polymerized (poly) film produced is optically anisotropic, used for optical components (column 1, lines 5-15).

Regarding claims 21-22, Omelis fails to teach that the layer is polymerized with a preferred orientation direction.

Shannon teaches that the layer is polymerized with a preferred orientation direction (aligned) (claim 21), and with locally varying preferred orientation directions (multi-oriented) (claim 22) (column 10, lines 25-30). Shannon teaches that under ultraviolet light irradiation, nematic and smectic mesophases can undergo rapid photopolymerization to freeze-in the

structure and orientation of the nematic and smectic phases, which provide valuable optical and physical properties (column 1, lines 13-23).

Therefore, because Shannon demonstrates the advantages of polymerizing the layer with a preferred orientation direction, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have done so with the crosslinkable liquid crystal component of Omelis, in order to provide the desired valuable optical and physical properties to the finished article.

Regarding claim 24, Omelis fails to teach that the anisotropic liquid crystal layer has the function of a polarizer in an optical component.

Shannon teaches that the aligned multi-oriented liquid crystal film functions as a polarizer (polarizing film) (column 10, lines 64-70).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used the anisotropic liquid crystal layer of Omelis as a polarizer in an optical component, as taught by Shannon.

Both Shannon and Omelis are directed to anisotropic liquid crystalline film, and are therefore analogous art.

5. Claims 9-10, 12-14, 18, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Omelis in view of Shannon as applied to claims 1-8, 11, 16-17, 19-22 above, and further in view of Schadt et al. (US 5,602,661).

Regarding claim 9, Omelis in view of Shannon, has been discussed above, and fails to teach that the liquid crystal has a cholesteric phase.

Schadt teaches that chiral molecules are added to provide a cholesteric liquid crystal phase filter (column 5, lines 20-25).

Therefore, because Schadt demonstrates the desirability of liquid crystal with a cholesteric phase, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used liquid crystal having a cholesteric phase, as the liquid crystal of Omelis in view of Shannon, in order to provide a cholesteric filter.

Regarding claim 10, Omelis in view of Shannon, has been discussed above, and fails to teach that the liquid crystal has a ferroelectric phase.

Schadt teaches the use of liquid crystals with ferroelectric phase (ferroelectric effect) in order to obtain the respective combined electro-optical effects, which is well known in the art, for liquid crystal displays (column 7, lines 44-55).

Therefore, because Schadt demonstrates the desirability of liquid crystal with a ferroelectric phase, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used liquid crystal having a ferroelectric phase, as the liquid crystal of Omelis in view of Shannon, in order to provide a ferroelectric liquid crystal display.

Regarding claims 12, 24, Omelis in view of Shannon, has been discussed above, and fails to teach the addition of chiral molecules, or that the layer has the function of an optical filter or a retarder.

Schadt teaches that chiral molecules are added to make an optical cholesteric (LC phase) filter or retarder (column 5, lines 20-25).

Therefore, because Schadt demonstrates the desirability of adding chiral molecules to liquid crystal, it would have been obvious to one of ordinary skill in the art at the time the

invention was made, to have added chiral molecules to the liquid crystal of Omelis in view of Shannon, in order to provide an optical cholesteric filter or retarder.

Regarding claims 13-14, 24, Omelis in view of Shannon, has been discussed above, and fails to teach the addition of other dye molecules or dichroic molecules, or that the layer has the function of a polarized light emitter.

Schadt teaches that dichroic dyes are added to provide the function of an optical dichroic filter, or polarized light emitter (beam splitter) (column 5, lines 10-15).

Therefore, because Schadt demonstrates the desirability of adding dichroic dyes to liquid crystal, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have added dichroic dye molecules to the liquid crystal of Omelis in view of Shannon, in order to provide an optical dichroic filter, or polarized light emitter.

Regarding claim 18, Omelis in view of Shannon, has been discussed above, and fails to teach a substrate having an electrically conductive surface.

Schadt teaches that a conductive substrate (electrode layer) carries a layer of the polymerized mixture in an STN cell (column 7, lines 50-60).

Therefore, because Schadt demonstrates the use of a conductive substrate, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a conductive substrate to carry the layer of polymerized mixture of Omelis in view of Shannon, in order to provide an STN cell.

Schadt teaches a polymerizable mixture of cross-linkable liquid crystal monomer (column 3, lines 40-45) which has acrylate or diacrylate components (column 15-30) in the formation of a hybrid layer which is optically anisotropic (column 3, lines 45-55). Omelis and

Shannon are both directed to anisotropic liquid crystal layers. All three references are therefore analogous art.

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Omelis in view of Shannon as applied to claims 1-8, 11, 16-17, 19-22 above, and further in view of Akashi et al. (US 5,589,237).

Omelis in view of Shannon has been discussed above, and fails to teach the addition of fluorescent molecules.

Akashi teaches a liquid crystal display device (abstract) wherein the liquid crystal layer contains fluorescent molecules (dyes) to improve light scattering properties (column 5, lines 55-60).

Therefore, because Akashi teaches the desirability of adding fluorescent molecules to liquid crystal, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have added fluorescent molecules to the polymerizable mixture of Omelis in view of Shannon, in order to obtain an optical element with improved light scattering properties.

7. Claims 23, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Omelis in view of Shannon as applied to claims 1-8, 11, 16-17, 19-22 above, and further in view of Ichimura et al. (US 5,706,131).

Omelis in view of Shannon has been discussed above, and fails to teach that the polymerized layer has the function of an orientation layer as well as the function of a polarizer.

Ichimura has a polarizer (polarizing element) having photoactive molecules containing at least one double bond selected from non-aromatic (vinylic) C=C and non-aromatic N=N (column 2, lines 51-56), an example being an azo dye molecule (column 4, lines 15-20).

Ichimura teaches that the polarizer is polymerized (baked) with locally varying preferred orientation directions (irradiated with linear polarized lights different in axis of orientation at the time of baking) (column 16, lines 10-20). Ichimura teaches that the polarizer has the additional function of an orientation layer since a dichroic molecular layer formed on the photoactive layer is anisotropically oriented (aligned) (column 2, lines 1-15).

Therefore, because Ichimura teaches that the layer polarizer with varying preferred orientation directions has the additional function of an orientation layer, it would have been obvious to one of ordinary art at the time the invention was made, to have provided the polymerized layer of Omelis in view of Shannon, with the function of an orientation layer as well as a polarizer, as taught by Ichimura.

Ichimura, Omelis and Shannon are directed to anisotropic liquid crystalline film, and are therefore analogous art.

Response to Arguments

8. Applicant's arguments with respect to claims 1-25 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached on (571)272-1498. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S. Hon.
Sow-Fun Hon
03/04/05

HAROLD PYON
SUPERVISORY PATENT EXAMINER
1772
3/4/05